

**REMARKS**

In an office action dated October 20, 2003, claim 38 has been rejected under 35 U.S.C. §112, first paragraph, and claims 19, 20 and 22-38 have been rejected under 35 U.S.C. §103. In response, Applicants have cancelled claims 28-36 and provide the herein remarks. Presently, claims 19, 20, 22-27 and 37-38 are pending in the application.

**Rejections Under §112, First Paragraph**

Claim 38 has been rejected under §112, first paragraph, as allegedly failing to comply with the written description requirement. Specifically, the Examiner contends that support for the limitation “wherein the oxidized starch product is obtained within thirty minutes” is not seen in the specification.

In response, Applicants point the Examiner to page 15, lines 19-22 of the specification where Example 5 demonstrates how oxidation of amylopectin potato starch is achieved within thirty minutes. Oxidation is achieved when the oxidation reaction is complete, which is determined by establishing that no hydrogen peroxide is present.

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the above §112, first paragraph rejection.

**Rejections Under §103(a)**

Claims 19, 20 and 22-27 have been rejected under §103(a) as being unpatentable over Lotzgesell in view of Ewing or Wikstrom for the reasons set forth in a previous office action mailed January 13, 2003.

The Examiner contends that Applicants’ arguments filed July 16, 2003 are not persuasive. In particular, Applicants previously argued, and continue to argue, that (1)

Lotzgesell does not disclose the minute amounts of copper catalyst used in the claimed invention, and (2) that the minute amounts of catalyst used in the claimed invention are advantageous because, for example, the process water can be disposed of without harming the environment.

The Examiner states that the above arguments are not persuasive because (1) there allegedly is no patentable advantage for the use of the amount of catalyst in the instant claims over the amount set forth on the Lotzgesell patent, and (2) there is no evidence that the amounts of catalyst used in Lotzgesell is harmful to the environment. Applicants respectfully disagree.

Applicants are somewhat surprised at the Examiner's position that reducing the amount of copper catalyst required for the oxidation process would be trivial and not constitute a patentable advantage. Therefore, Applicants offer the following information to assist the Examiner in appreciating the patentable advantages of the present invention..

The presence of copper ions in waste water is a well-known problem because of the toxicity of the copper ions. The U.S. Environmental Protection Agency (EPA), on its website, explicitly mention that copper is toxic at concentrations of 100 milligrams per liter (i.e. 100 ppm). Enclosed is a copy of the pertinent pages from the EPA website. The invention disclosed by Lotzgesell requires the use of copper catalyst in this toxic range.

Also enclosed are copies of pages from Ecoshield's website on which it is stated that the EPA aims to introduce legislation that would set a limit of 0.28 milligrams per liter (i.e. 28 ppm) of copper ions in waste water. This upper limit is well below the minimum concentration required by Lotzgesell (32 ppm). See Table 1, sample D of Lotzgesell.

In accordance with the present invention, it has been discovered that the concentration of copper ions required for the oxidation of amylopectin root or tuber starch can be significantly reduced. In fact, this concentration can be reduced to far below the upper limit that the EPA proposes.

In accordance with the claimed invention, the copper concentration required is below 5 ppm (5000 ppb), which means that the waste water of the oxidation process does not require decontamination or dilution before it can be safely disposed of. This is, of course, a very important technical, and patentable, advantage.

Applicants contend that the above discussion, coupled with the disclosure of Ewing which teaches away from using small amounts of catalyst (see column 3, lines 3-10 of Ewing), is sufficient to distinguish the claimed invention from the cited prior art.

Furthermore, Applicants note that Wikstrom was filed in 1997, some ten or so years after the disclosures of Lotsgesell (1976) and Ewing (1970). As a consequence, it must be assumed that the very superficial reference in Wikstrom to hydrogen peroxide oxidation must refer to a known method of oxidation.

None of the working examples in Wikstrom utilize hydrogen peroxide oxidation, and the description lacks any specific process parameters. Thus, it must be assumed that Wikstrom intended any known oxidation process involving hydrogen peroxide (e.g. Lotsgesell or Ewing). As a consequence, it must be inferred that Wikstrom believed that a copper ion concentration which is much higher than the concentration presently claimed would be necessary.

In paragraph 7 of the office action, the Examiner contends that no unexpected results have been set forth with regard to the claimed invention. Applicants respectfully disagree.

As demonstrated in Table 3 of the present application, oxidation of conventional potato starch with hydrogen peroxide gives very unstable derivatives. For example, even at 90°C a thickening effect is observed. See bottom of page 15 through page 16 of the application.

As a result of the present invention, Applicants have discovered that oxidation of amylopectin potato starch (i.e. at least 95 wt.% amylopectin) using hydrogen peroxide and a minute amount of copper catalyst (about 5 ppb to about 5000 ppb) provides unexpectedly superior results.

There is simply no suggestion or motivation in Lotzgesell, Ewing or Wikstrom or a combination thereof, to use hydrogen peroxide in combination with the claimed amount of catalyst to oxidize amylopectin potato starch.

In fact, Ewing actually teaches away from using small amounts of catalyst. In column 3, lines 3-10, Ewing explains that about 0.015 percent copper sulfate is preferred and that at concentrations below about 0.008 percent, the efficiency of the oxidation process is reduced. Also, at levels above 0.03 percent, the temperature stability of the starch past is reduced.

In order to establish a *prima facie* case of obviousness, one of the criteria to be met is that the prior art references, when combined, must teach or suggest all of the claim limitations. See MPEP §2142.

Applicants have demonstrated the importance of using of substantially less catalyst in conjunction with hydrogen peroxide to oxidize amylopectin potato starch, and obtain stable, starch derivatives having low viscosity, as compared to conventional starches.

Upon combining the teachings of Lotzgesell, Wikstrom and Ewing, all of Applicants claimed limitations are not taught or suggested. Therefore, based on the foregoing discussion, Applicants claimed invention is not obvious over Lotzgesell in view of Wikstrom and Ewing.

Applicants respectfully request that the rejection of claims 19, 20 and 22-27 under §103 based on Lotzgesell, in view of Wikstrom and Ewing, be reconsidered and withdrawn.

Claims 28, 29 and 31-33 have been rejected under §103(a) as being unpatentable over Wikstrom. Additionally, claims 30 and 34-36 have been rejected under §103(a) as being unpatentable over EP 0799837 to Huizenga.

In response, and in an effort to move the application towards allowance, Applicants have cancelled claims 28-36. Accordingly, the rejection has been rendered moot.

In light of the foregoing amendments and remarks, Applicants respectfully submit that the application is now in condition for allowance. If the Examiner believes a telephone discussion with the Applicant's representative would be of assistance, he is invited to contact the undersigned at his convenience.

Respectfully submitted,



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